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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/809,626	Applicant(s) ARRIGO ET AL.	
	Examiner Tom V. Sheng	Art Unit 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22,24,27-51 and 77-79* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22,24,27-51 and 77-79* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2 and 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frank (US 5,457,478) in view of Junod et al. (US 5,854,621), hereinafter Junod, and Hilton et al. (US 5,798,748), hereinafter Hilton.

As for apparatus claim 1 and associated method claim 6, Frank teaches an optical sensing assembly (input optics 38 and decoder 36; fig. 2; during the cursor control mode, position data is generated by decoder 36 based on movement of control device 30 on reflective pad 46; column 4 lines 39-39-44 and 50-57) for a computer input device (control device 30) configured to receive power from a power source (during a cursor control mode, transmitter 44 of control device 30 receives power from a constant power source; fig. 8; column 11 lines 5-10), the optical assembly comprising:

a photo-sensitive element (sensor array 148 of input optics 38; fig. 7; column 8 lines 34-42) configured to receive reflected light from a light source (receive external signals from reflective pad 46; column 8 lines 22-25) to produce a first image data associated with a first image (a first bit map image is generated based on an illumination of the sensor array 148; column 9 lines 10-16) and a second image data associated with a second image (after the first bit map image is transferred out, a

second bit map image will be generated; column 9 lines 48-50);

an image data processing logic (fig. 7; coordinate generator 154 containing a comparison means and a look-up table; column 9 lines 50-52) coupled to the photo-sensitive element (as shown in fig. 7 from sensor array 148 to coordinate generator 154 via a bit map imager 152) for receiving the image data (inherent). [Of claim 6: determining image difference data from differences between the first image data and the second image data (look-up code indicating differences between the first bit map image and the second bit map image is generated; column 9 lines 52-65)]. In other words, the coordinate generator 154 provides direction and distance moved for updating the cursor, during the cursor control mode.

However, Frank is silent on the power source provided to the control device 30 as being self-contained. On the other hand, Frank teaches that the control device 30 is to be operated as both a cursor control device and a remote control device. Since at least the remote control devices are well known to be self-powered by means of a battery, it would have been obvious to one of ordinary skill in the art, to similarly incorporate a battery inside the control device so as to make it self-powered, the advantage being its movement not restricted by a wire in the case of external power provision.

Still, Frank does not teach a power control logic operatively coupled to the image data processing logic and configured to implement a native power control mode wherein an internal algorithm changes the power consumption of the optical sensing assembly

from a full power mode to one or more lower power modes based on the image (difference) data.

Junod teaches a battery-powered wireless mouse 10 (fig. 1 and 2; column 2 lines 20-22). Specifically, Junod teaches that under normal operation, after a period of nonuse or lack of activity, the mouse 10 will enter a standby mode, during which the opto-mechanical encoders (300, 310; fig. 4) will be sampled less frequently (column 6; lines 32-53). Moreover, if any activity does occur (i.e. movement of the mouse, depression of a button, etc.), the mouse returns to normal mode (column 6 lines 53-65).

One of ordinary skill in the art would recognize that the control of different power modes (normal, standby and sleep) corresponds to claimed power control logic and at least the standby mode corresponds to claimed one lower power mode. Further, by incorporating Junod's energy conserving method into Frank's control device, the battery life of the device would be advantageously extended. Therefore, it would have been obvious to incorporate Junod's power controlling method into Frank's self-powered control device, as it would advantageously extend the operating time of the control device between changing of batteries.

Still, Frank, as modified, does not teach the feature of being able, based on the image data, to qualify whether the detected activity is a false or true activity.

Hilton teaches using optical sensors in a mouse (fig. 4; column 13, lines 31-40; fig. 5 and 6; column 14, lines 11-27). Specifically, Hilton teaches the idea of zeroing any (movement) data less than a minimum sensed value (column 17, lines 61-65), with

the advantage of preventing unwanted drifting from occurring due to hysteresis inherent in the mouse (column 13, lines 49-62).

One of ordinary skill in the art would recognize that similarly Frank's mouse movement can be qualified based on a threshold such any value below which is considered false movement/activity and vice versa. Therefore, it would have been obvious to incorporate a means to qualify detected activity so that false activity would be considered as no activity and as a result the power control logic would function efficiently.

As for claim 2, Frank teaches that the photosensitive cells of the sensor array 148 may be photo diodes (column 8 lines 37-39).

As for claim 4, Frank teaches that the input optics 38 contains a lens for focusing the external signal (column 7 lines 28-33).

As for claim 5, the look-up code indicating the difference between the first bit map image and the second bit map image is generated and is then referred to the look-up table to generate a control code indicating the direction and distance of the movement of the control device (column 9 lines 58-65).

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Frank and Junod as applied to claims 1 and 2 above, and further in view of Hong et al. (US 6,803,954), hereinafter Hong.

As for claim 3, Frank as modified teaches analyzing image difference to determine movement. However, Frank as modified is silent regarding wherein the

photo-sensitive element is a CCD array having a set of pixels and the image data comprising a bit vector corresponding to a set of states of the set of pixels.

Hong teaches predicting a moving vector of a compressed image. In particular, Hong teaches using a CCD coupled with a processor to process image for a moving vector to improve image quality (Abstract). One of ordinary skill in the art would recognize that Hong's CCD and processing setup could similarly be utilized in modified Frank's system for improved quality and thus better determination of any movement.

Therefore, it would have been obvious to change modified Frank's optical sensing setup with Hong's CCD and processing in order to further improve the determination of any movement.

4. Claims 7, 8, 10, 14, 15, 17, 19-22, 24, 27, 29, 35, 38, 43-45 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Junod in view of Hilton.

As for clam 7, Junod teaches a method of managing power consumption of a wireless device (wireless mouse 10; fig. 1) having a plurality of power consumption modes (normal, standby and sleep modes; column 6 lines 37-40), the method comprising:

in a first power consumption mode (normal mode):

operating the wireless device at a fist power level (opto-mechanical encoders 300, 310 operating at full speed; fig. 4; column 6 lines 40-44),

in response to receiving a first activity data, maintaining the first power consumption mode (i.e. when the mouse is being used), and

in response to receiving no activity data for a time period associated with the first power consumption mode (after a period of nonuse; column 6 line 44), transitioning to a second power consumption mode (enters standby mode; column 6 lines 45-46);

in the second power consumption mode (standby mode):

operating the wireless device at a second power level that is less than the first power level (opto-mechanical encoders sampling at a lower speed; column 6 lines 45-48),

in response to receiving a second activity data (checking for activity such as movement of the mouse, depression of a button or depression of the channel program button; column 6 lines 61-63), transitioning to the first power consumption mode (returns to normal mode; column 6 lines 64-65), and

in response to receiving no second activity data for a time period associated with the second power consumption mode (after a further period of nonuse; column 6 lines 50-51), transitioning to a third power consumption mode (enters sleep mode; column 6 line 51); and

in the third power consumption mode (sleep mode):

operating the wireless device at a third power level that is less than the second power level (CPU 320 enters stop mode with remaining circuitry enters full static condition; column 6 lines 52-53), and

in response to receiving a third activity data (checking for activity such as movement of the mouse, depression of a button or depression of the channel program

button; column 6 lines 61-63), transitioning to the first power consumption mode (returns to normal mode; column 6 lines 64-65). See also fig. 5 and column 6, line 66 through column 7 line 21.

Moreover, Junod teaches that other means of detecting mouse movement is possible, and in particular, mentions the use of a photo detector array. However, Junod does not teach maintaining the first power consumption mode (i.e. the normal mode) when activity data received is determined not a false activity data (i.e. true activity data).

Hilton teaches using optical sensors in a mouse (fig. 4; column 13, lines 31-40; fig. 5 and 6; column 14, lines 11-27). Specifically, Hilton teaches the idea of zeroing any (movement) data less than a minimum sensed value (column 17, lines 61-65), with the advantage of preventing unwanted drifting from occurring due to hysteresis inherent in the mouse (column 13, lines 49-62).

One of ordinary skill in the art would recognize that similarly Frank's mouse movement can be qualified based on a threshold such any value below which is considered false movement/activity and vice versa. Therefore, it would have been obvious to incorporate a means to qualify detected activity so that only true activity is recognized and facilitate the maintaining of the normal mode in operation.

As for claims 8 and 10, Junod teaches detecting movement of the mouse by means of opto-mechanical encoders 300, 310 (analyzed above) that corresponds to claimed motion detection.

As for claims 14, 15, 43, 44, Junod also teaches using depression of a button on the wireless mouse 10 as an activity (column 6 lines 61-65) that corresponds to claimed user input.

As for claim 17, 45, Junod teaches that only when activity is detected would the CPU 320 returns to normal mode from either standby or sleep mode (column 6 lines 60-65). Thus, without a third activity data, the third power consumption mode is maintained.

As for claims 19, 21 and 22, Junod teaches that during the standby (second) mode, the opto-encoders 300, 310 are sampled less frequently and further PLL circuitry 350-390 and RF amplifier 420 may be switched off (column 6 lines 44-50). Thus, the opto-encoders correspond to a power consuming module where power is decreased and the PLL circuitry or the RF amplifier corresponds to another power consuming module where power is shut off.

As for claim 20, Junod teaches that during the sleep (third) mode, the CPU 320 enters a stop mode that corresponds to claimed powering down a second power consuming module (first module being the opto-mechanical encoders).

Claim 24 is rejected per analysis of claim 7 with a photo detector array operating at full speed, lower speed and wake-up rate (column 6 lines 37-65) correspond to claimed querying at a first average polling rate, a second average polling rate that is lower than the first average polling rate, and a third average polling rate that is lower than the second average polling rate.

As for claims 27 and 29, the image sampling at the respective rates analyzed in claim 24 correspond to the claimed capturing of one image during each poll.

As for claims 35, 38, Junod teaches the checking for activities such as movement of the mouse, which corresponds to claimed motion detection.

As for claim 51, Junod does not teach wherein the wireless device comprises one of a mobile phone, text messager or a personal digital assistant. On the other hand, one of ordinary skill in the art would recognize that the power saving system of Junod's wireless mouse could similarly be applied to a wireless device such as a mobile phone because of the widely available built-in photo detector (i.e. camera).

Therefore, it would have obvious to utilize power saving by means of a photo detector in a wireless device such as a mobile phone because of the availability of the photo detector and the clear advantage of power management via movement sensing.

5. Claims 9, 11-13, 16, 18, 28, 30, 31-34, 36, 37, 39-42 and 46-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Junod and Hilton as applied to claim 7 and 24 above, and further in view of Frank (US 5,457,478).

As for claims 9, 11, 31, 33, 36-37, 39-40, Junod's motion detection is performed by means of a ball 200, photosource 300 and photodetectors 310. The rotation of the ball 200 is converted into digital signal by means of the opto-mechanical encoders 300, 310 directly representative of the movement of the mouse (column 5 lines 1-5 and 54-63). Thus, Junod does not teach determining motion detection through a comparison of images on a photosensor. On the other hand, Junod teaches that other means of

detecting mouse movement is possible, and in particular, mentions the use of a photo detector array (column 5, lines 5-10).

Frank teaches a control device 30 (figure 2) that normally acts as a cursor control device. Input signals are received via input optics 38 (figure 2), furthermore signals are decoded into position data by a decoder 36 (figure 2) and sent to a host computer 34 (column 4, lines 6-57). Frank further teaches how the input signals are read as images (by means of a photosensitive cell array), and by comparing the images (i.e. the image difference or all pixel differences) the direction and distance of movement would be known (figure 7, column 9 line 10 to column 10 line 9). One of ordinary skill in the art would recognize that Frank's direction and movement detection correspond to claimed motion detection.

Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to incorporate Frank's input optics and decoder in the place of Junod's ball and opto-mechanical encoders, since Junod mentions the use of photo detector array and because Frank's input optics and decoder provide enhanced reliability to Junod's ball and opto-mechanical encoders by eliminating mechanical components.

As for claim 12, each photosensitive cell of the sensor array 148 corresponds to a pixel and an image difference correspond naturally to a change of pixel.

As for claim 13, 41 and 42, Junod does not teach using interferometric techniques in motion detection. Official Notice is taken of both the concept and advantage in using interferometry in motion detection as being well known in the art. It

would have been obvious to use interferometry for motion detection as a functional equivalent choice to the use of image sensor array.

As for claim 16, Junod does not teach the use of a wheel for user input. On the other hand, a wheel is a well-known alternative to the middle button of Junod. It would have been obvious to substitute the middle button with a wheel whenever scrolling function is also intended for a mouse.

As for claim 18, 46, Junod does not teach claimed fourth power consumption mode. On the other hand, it would have been obvious to one of ordinary skill in the art to incorporate a fourth power consumption mode whenever an additional power consumption level is desired and manageable, if this additional level provides further power saving without overly complicates the power control means.

As for claims 28, 30, 32 and 34, Frank as modified by Junod does not teach capturing a plurality of images during a single poll for detecting the changes in values of the pixels.

On the other hand, one of ordinary skill in the art would recognize that by comparison each single data poll with two received images correspond to two consecutive samples. Thus, since each data query/poll involves two samples, consecutive queries/polls are no different from consecutive samplings. Incidentally, changes in sampling rate can directly correspond to changes in the query/poll rate, with the query/poll rate being half the sampling rate.

Therefore, it would have been obvious to modify combined Frank and Junod's invention to receive image data by means of query/poll of two consecutive image data,

because of the functional equivalence between regular sampling and receiving of two image data with each query/poll.

Claims 47-50 are rejected per analysis of claims 19, 21 and 22.

Response to Arguments

Applicant's arguments with respect to claims 1-22, 24-25 and 27-51 have been considered but are moot in view of the new ground(s) of rejection. Because of the need for double patenting rejections, this action is made non-final.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 1-6 and 77-79 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-17 of U.S. Patent No.

6,781,570. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the application are obvious over the claims of the patent.

Detail of comparison between claim 1 of the application and the patent is as follow.

Claim 1 of the application	Patent 6,781,570
A photo-sensitive element configured to receive reflected light from a light source to produce a first image data associated with a first image and a second image data associated with a second image.	The optical sensor for characterizing movement relative to the wireless device with a number of images (claim 1). The optical sensor includes at least an LED for providing light that is reflected off a surface or object, the reflected light being projected onto a photo-sensitive element included in the optical sensor (claim 7). Claimed photo-sensitive element corresponds to the photo-sensitive element of the optical sensor, of the patent. Claimed reflected light from a light source corresponds to the light reflected off a surface or object and originates from an

	LED, of the patent. There is no direct correspondence between claimed first and second image data and the characterizing movement with a number of images, of the patent.
An image data processing logic coupled to the photo-sensitive element for receiving the image data and configured to detect activity based on the image data and to qualify detected activity as false activity.	A processing unit ... for receiving ... movement data (claim 1). The optical sensor ... for providing movement data that is derived from the images to the processing unit (claim 1). The processing performed by the processing unit includes qualifying the movement data so as to determine if the associated movement is true user activity ... of false user activity ...(claim 3). Claimed image data processing logic coupled to the photo-sensitive element is inherent as the optical sensor, of the patent, teaches providing movement data derived from the images. Claimed qualifying of activity corresponds to the qualifying of movement data as to

	true or false user activity, of the patent.
A power control logic operatively coupled to the image data processing logic and configured to implement a native power control mode wherein an internal algorithm changes the power consumption of the optical sensing assembly from a full power mode to one or more lower power modes based on the image data.	Wherein the native mode of the optical sensor includes at least three power consumption levels self-controlled by the optical sensor (claim 14). Wherein ... the optical sensor further comprises computing logic that controls the transition between the power consumption levels (claim 15). Claimed power control logic corresponds to the computing logic of the patent. Claimed native power control mode corresponds to the native mode of the optical sensor, of the patent. Claimed internal algorithm is inherent with the computing logic of the patent. Claimed changes between power modes correspond to the transition between the power consumption levels, of the patent.

As analyzed above, there is no direct correspondence between claimed first and second image data and the characterizing movement with a number of images, of the

patent. On the other hand, one of ordinary skill in the art would recognize that in order to characterize movement with a number of images, it would obviously involve first converting the images to image data first in order to facilitate the characterization of movement. Therefore, it would have been obvious to provide conversion of received images to image data, in order to facilitate subsequent characterization of movement.

Claims 2-6 and 77-79 are similarly rejected by claims 1-17 of the patent.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom V. Sheng whose telephone number is (571) 272-7684. The examiner can normally be reached on 9:00am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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